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LOOK TO THE 80'S: WILL THEY BE RUNNING ON GASOHOL?

DFSC FUEL LINE

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TECHNICAL PUBLICATION

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FUEL LINE is an official technical publication, published quarterly by and for Defense Fuel Supply Center and fuel oriented clientele. FUEL LINE is designed to provide timely, factual information on policies, plans, operations and technical developments of Defense Fuel Supply Center and other interrelated subject matter. Views and opinions express in the FUEL LINE are not necessarily those of the Department of Defense. All inquiries should be addressed to: Defense Fuel Supply Center, Editor, FUEL LINE, Public Affairs Office (AP), Cameron Station, Alexandria, Virginia, 22314. Telephone: (202) 274-6489.

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Gasohol: Fuel of the Eighties

-Its Promise, Prospects, and Properties

by CAPT Brian R. Lenz, USAF
Directorate of Technical Operations

Much has been said and written about gasohol, both pro and con, and as the energy crunch intensifies, we are likely to hear even more about it and other alternate fuels. While gasohol offers a promise of helping the U.S. to achieve energy independence, there are many factors which must be studied before we can begin to contemplate the extensive use of gasohol. The following article examines the legislative activity which is spurring the U.S. on to increased use of gasohol as well as its various properties which must be considered in determining its efficiency. We also take a brief look at various other oxygenated fuels and their potentialities.

The decade of the seventies has seen two new petroleum products enter the Defense Logistics system. Because of environmental concerns, unleaded gasoline was mandated in the early seventies. In the latter part of the decade, JP-8 replaced JP-4 for operational units stationed in the United Kingdom. And now gasohol is becoming the new fuel of the eighties. This article recounts events that have promoted the development of gasohol and the prospects for alcohols as motor fuel.

Gasohol has been in existence since the thirties, however it was only recently that two seemingly unrelated events generated increased interest in it. Supplies of petroleum products, mainly gasoline, were greatly reduced creating long lines at service stations. At the same time, the agricultural sector of the U.S. was pressing for improved economic conditions for the farmer. Gasohol was seen as a resolution to both problems since gasoline supplies would be stretched while a good market for agricultural products was created.

There has been much legislative activity to promote gasohol production and use. Over 50 items in Congress and over 150 bills in 36 states are pending. Public Law 96-107[1], established in November 1979, crystalized certain political pressures by directing that DOD use gasohol to the maximum extent feasible consistent with overall defense needs and sound vehicle management practices. At that time DFSC had already begun preparing for the advent of gasohol in the DLA system. We tasked MERADCOM with development of a description for gasohol that could be used to quickly obtain it for the federal fleet. In January 1980, the President's Alcohol Fuels Program was released. This program set a target for domestic production of 500 million gallons of gasohol during 1981, and included a variety of tax incentives for helping to attain this goal. Both GSA and DOD directed that DOD and other federal agencies use gasohol.[2,3] The goal that was established directed that 25% of DOD's unleaded gasoline usage be gasohol by 1985.[4]

The Energy Security Act (ESA), passed in June 1980, contained extensive provisions for gasohol fuels. Title II of the Act, "Biomass Energy and Alcohol Fuels Act of 1980", assumes that biomass energy resources can play a significant part in reducing U.S. dependence on imported petroleum products in the near future and thus calls for a national program to increase production of biomass energy. This program is to be a multiple-use framework that does not impair the capacity for producing food or fiber. The ESA established a production goal for alcohol fuels of 60,000 BBLS/day by 31 December 1982, and directed that by 1990 alcohol production equal 10% of projected gasoline consumption in the U.S..

Financial assistance for biomass projects in the form of loans, loan guarantees and purchase agreements was also specified in the ESA. This will be handled by the Secretary of Agriculture for projects under 15 million gallons a year, and by the Secretary of Energy for projects over that amount. The funds for these projects were provided by Public Law 96-304.[5] Currently, procedures are being developed to implement financial assistance for biomass energy and municipal waste projects that will replace low cost energy products such as coal or natural gas.[7] The ESA includes procedures for implementing price guarantees and purchase agreements for biomass energy projects. Purchase agreements can do much to expand the alcohol production market by making higher cost biomass energy available to federal agencies at prevailing market prices of the products displaced.

With a view towards developing a ready market for gasohol, the ESA requires that the President issue an executive order directing federal agencies to use gasohol where available at reasonable prices and in reasonable quantities. DOE is drafting this executive order which will clarify the gasohol procurement criteria to be used for federal agencies.*

The various programs established in the ESA will take some time to be fully effective. Currently DFSC is working to obtain gasohol for the federal fleet. When requirements calls to federal activities are made, procedures to obtain gasohol are outlined. Current policy on gasohol use is brought to the attention of each activity for their use in generating requirements.

Gasohol can be requested in one of two manners. Gasohol only requirements are generated for trial test programs where only gasohol is desired. If gasohol cannot be obtained, the activity would be notified and local purchase authorized. Gasohol can also be requested on an either/or basis

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* The executive order was signed on 5 January 1981.

GASOHOL PROCUREMENT STATUS

(REQUIREMENTS ARE EXPRESSED IN MILLION GALLONS)

REGION	REQUIREMENTS DUE TO DFSC BY	START DELIVERY	UNLEADED GAS REQUIREMENT	GASOHOL REQUIREMENT
7	15 APR	1 NOV	29	4
4	15 SEP	1 APR	40	1.6
5	15 OCT	1 MAY	11	1.9
6	15 NOV	1 JUN	25	*
8	15 DEC	1 JUL	12	*
3	15 JAN	1 AUG	32	*
1	15 FEB	1 SEP	6	*
2	15 MAR	1 OCT	19	*

*NOT AVAILABLE AT TIME OF PRINTING

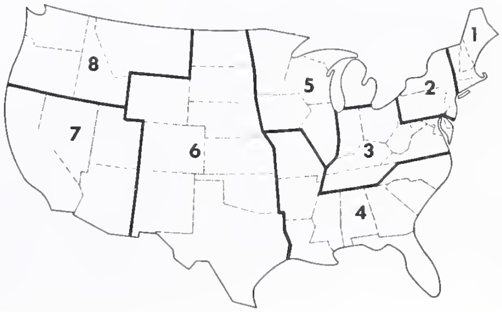
with unleaded gasoline. In this case, DFSC would solicit for both gasohol and unleaded gasoline with the contract award going to the lowest bidder. This method creates the maximum amount of competition and allows DFSC the greatest latitude in obtaining contract coverage for customers.

Region 7 was the first procurement region where gasohol was emphasized in DFSC's procurement activities. Of the 29 million gallons of unleaded gasoline required, approximately 4 million was identified as gasohol. DFSC received offers for about 1.6 million gallons of gasohol but was only able to award 223,000 gallons. The gasohol response in Region 7 is very encouraging considering it is not a strong area for alcohol production and has historically been a difficult area in which to obtain gasoline coverage. Regions 4, 5, and 6 are the next areas in which gasohol will be emphasized. These procurement regions are expected to yield increased coverage of gasohol.

After looking at the progress made, the critical question is whether gasohol will reduce U.S. dependence on imported petroleum. The answer to this is based on the energy balance of the process of making alcohol. An API publication[8] reports that making ethanol from sugar cane and methanol from wood are net energy producers, i.e., the BTU output exceeds the energy required to make the alcohol. The API report also relates that producing ethanol from corn or corn stover is a net consumer of energy.

Analysis of the energy balance has been quite extensive and shows results which vary markedly with the total system energy inputs. Also, newer processes which improve the energy balance are being developed. Processes that use coal and produce alcohol may be of value as coal conversion processes. Alcohol production using coal has about the same overall efficiency as existing coal liquefication processes.[9]

DFSC PROCUREMENT REGIONS



The various performance properties of gasohol further complicate the energy balance analysis. The following must be considered:

● Octane: The addition of 10% ethanol to unleaded gasoline of 87 (R + M)/2 will raise its antiknock index by up to three numbers.[10] Engine "pinging" is reduced, but this may not result in increased power or fuel economy unless the engine compression ratio is increased to take advantage of the higher octane fuel.[11]

● BTU content: Ethanol has a content of 84,610 BTU per gallon. This compares to gasoline with 124,850 BTUs per gallon, which gives gasohol 2-3% less BTUs than gasoline.[12] Some laboratory tests using well tuned late model vehicles filled with gasohol have shown lower mileage approximately equal to the lower BTU content of gasohol.[13]

● Cleaning action: Gasohol tends to dissolve gums and residues in storage tanks and fuel systems. Upon initial conversion of an older system to gasohol, fuel filter plugging can be a problem until sufficient gasohol is used to clean the system. Commercial service stations have generally installed a final filter in the issue line to remove any residues that the gasohol may have picked up in the storage tank. Once the fuel systems are clean they should remain so.

● Auto-oxidation: Gasohol has a tendency to form gums upon long term storage. This auto-oxidation process can result in deterioration of the quality of the gasohol. For this reason the purchase description for gasohol specifies that it is not intended for long term storage and should be replenished at least every 30 days.[14]

● Water tolerance: Pure alcohol will mix with gasoline in any proportion. However, alcohol, water and gasoline will not mix in all proportions. Generally, the presence of 0.7% volume of water is sufficient to cause the alcohol to separate. Additional water can be retained in gasohol by increasing the temperature, ethanol content, or aromatic content of the base gasoline. Phase separation problems are best reduced by decreasing the introduction of water to the gasohol. Vehicle operations usually continue after phase separation which indicates that this problem is normally not severe. One advantage of gasohol is that the alcohol will absorb water in the fuel system and prevent fuel line freeze up during winter operation.

● Environmental considerations: The addition of 10% ethanol to gasoline will raise the vapor pressure about 0.5 to 1.0 psi depending on the gasoline used. This increase in vapor pressure does create the potential for an increase in evaporative emissions. Exhaust emissions vary considerably with the engine type, engine settings, (lean or rich), and driving conditions. Tests conducted for the Environmental Protection Agency generally showed a decrease in hydrocarbon and carbon monoxide emissions but an increase in oxides of nitrogen.[15] The leaning of the fuel mixture using gasohol as compared to gasoline causes these emissions to be expected. Additional testing and analysis is needed in this area.

DOE Finds Favorable Energy Balance for Ethanol

The energy balance issue is central to the question of whether the production of ethanol can reduce the need for imported petroleum in this country.

The Department of Energy released in October 1980 a detailed study of whether the production and use of ethanol from crops for fuel consumes more scarce energy resources than the ethanol contains.

The study found a positive energy balance.

A key factor in the favorable energy balance found by this study is that the analysis is based on plants employing the latest energy-efficient heat recovery techniques used in the chemical industry. New ethanol plants are expected to be much more energy-efficient than older plants designed and built before the rapid escalation in energy costs over the last several years.

Produced in cooperation with the U.S. National Alcohol Fuels Commission, the study works through calculations of the net gains in premium fuels that can be derived from the manufacture and consumption of ethanol from biomass. It calculates that all the petroleum and natural gas inputs, including the motor fuel needed to cultivate, harvest, and ship corn as well as the energy consumed in the production and shipment of ethanol, amount to less than the energy value of ethanol made from corn in a modern, efficient, coal-fired distillery.

The study, entitled "Energy Balances in the Production and End-Use of Alcohols Derived from Biomass," was prepared by the TRW Energy Systems Division. Copies will be available from the U.S. Government Printing Office in the near future.

- Material compatibility: The corrosive effects of gasohol on metals is still being evaluated. Even without phase separation, corrosion of magnesium alloys and ferrous metals could be a problem over a period of time. Most plastics, elastomers and gasket materials are not significantly affected by gasohol. However, cork and polyurethane have been found to be unsuitable for use with gasohol.

- Vehicle maintenance costs: Claims have been made that gasohol runs cleaner and thereby reduces engine maintenance costs,[16] while others say that the corrosive properties of gasohol increase engine wear and reduce engine life. Studies are needed to resolve this issue.

The foregoing discussion of gasohol characteristics demonstrates that gasohol does have the potential to reduce U.S. dependence on imported petroleum consumption. Other oxygenated fuels may also reduce petroleum consumption. These are:

● Gasohol with alcohol in excess of 10%: Brazil is currently marketing mixtures of gasohol at 20-40% alcohol. In the near future, a significant number of Brazil's vehicles should be running on straight ethanol.

● Methanol: This is being considered as a fuel alcohol for mixing with gasoline. It has some technical drawbacks such as lower BTU per gallon (64,640 compared to 84,610 BTU in ethanol), phase separation, and corrosion problems that are even more severe than with ethanol. The energy balance equations associated with methanol production are more favorable than those of ethanol and may stimulate its production and use. The use of straight methanol is also being extensively studied and has shown some favorable indication.

● Oxinol: This is a 50:50 mixture of methanol and t-butyl alcohol (TBA) blended to 5% concentration in unleaded gasoline. The TBA greatly reduces separation problems and the overall product has about a 1.7 higher octane rating than the base gasoline. Sun Petroleum Products is currently researching and test marketing this product.[17]

● Methyl Tertiarybutyl Ether (MTBE): MTBE has been used in Europe for over six years as an octane enhancer with favorable results. MTBE is made by reacting methanol with isobutylene in the presence of a catalyst. A 7% addition of MTBE to gasoline raises the antiknock index by about two numbers. The main advantage of MTBE is that it does not have the normal problems associated with gasohol. At least eight oil companies are currently marketing this product and its use is expected to greatly increase.

Oxygenated fuels do have the potential to reduce the dependence on imported petroleum. However, care must be exercised to ensure that energy efficient processes are used and that no deleterious effects to vehicle operations, environment or food production occur in the use of the end product. Efforts to expand the technology of oxygenated fuels and improve the capabilities of vehicles to use these new fuels must continue. The increased flexibility of the vehicle fleet to use new oxygenated fuels would provide a ready market as new technologies become available.

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[1] "DOD Authorization Act," Sec 815, Public Law 96-107, 93 Stat 817.

[2] "Defense Energy Program Policy Memorandum (DEPPM)," No. 80-4, (11 Feb 80).

[3] "FPMR G-147," GSA Bulletin, (10 Jan 80).

[4] "Defense Energy Management Plan," (1 Jul 80).

[5] "Supplemental Appropriations and Rescission Act 1980," Public Law 96-304, (8 Jul 80).

[6] Federal Register, Vol. 45, No. 159, (14 Aug 80), p. 54264.

[7] Federal Register, Vol. 45, No. 188, (25 Sep 80), p. 63822.

[8] "Net Energy Analysis of Alcohol Fuels," API Publication, No. 4312, (Nov 79).

[9] Ibid.

[10] U.S. DOE Bartlesville Energy Technology Center, "Guidelines for Fleet Operation Using Gasohol."

[11] Ibid.

[12] Emergency Fuels Utilization Guidebook, DOE/CS/54269-01, (Aug 80).

[13] U.S. DOE Bartlesville Energy Technology Center, loc. cit.

[14] USA MERADCOM, "Purchase Description #102B for Gasohol, Automotive, Unleaded," (28 Mar 80).

[15] J. L. Keller, "Methanol and Ethanol Fuels for Modern Cars," Preprint No. 08-79.

[16] Southwest Research Institute, "Proceedings on Conference on Fleet Use of Unique Automotive Fuels," Report No. MED 117, (Aug 80)/

[17] Ibid.

Synfuels Plant Reaches Landmark

U.S. Department of Energy

The U.S. Department of Energy's synthetic fuels plant in Baytown, Texas -- one of the two largest in the country -- passed its 1000th hour of operation on 26 September 1980.

The experimental plant, using the Exxon Donor Solvent process, has been operating in a series of start-up tests since late June 1980.

At maximum capacity, it converts up to 250 tons per day of coal into approximately 600 barrels of synthetic oil.

Commenting on the completion of 1000 hours of operations, DOE's Assistant Secretary for Fossil Energy George Fumich, Jr., said: "Start-up of this complex plant has progressed better than we had ever anticipated. Each day of operation increases our confidence that this technology will be in commercial use before this decade is out."

The plant uses a process which breaks down the molecular structure of coal with heat and pressure, allowing hydrogen atoms to attach to the molecules. As more hydrogen becomes attached, the coal liquefies. Hydrogen for the process is "donated" to the coal by a liquid solvent, accounting for the name "Exxon Donor Solvent" process.

Partners to date in the project, in addition to DOE, include the Exxon Company U.S.A., the Electric Power Research Institute, Phillips Coal Company, ARCO Coal Company, Ruhrkohle AG, and the Japan Coal Liquefaction Development Company, Ltd.

Valuable Offal: *Proper Disposal Saves Money*

by Lt Col Robert N. Watson, USAF
Defense Fuel Region, Southeast

Contaminated petroleum products are now a valuable resource. Better known as "slop fuel", they are petroleum products which can no longer be used as originally intended. These waste fuels are generated through tank cleaning, pipeline flushing and interface mix, draining manifolds, retain samples, etc.

Some Defense Fuel Support Points collect several hundred thousand gallons of slop fuel annually. Waste JP4 currently sells for 30 to 36 cents a gallon, waste petroleum base engine oils for 15 to 20 cents a gallon and synthetic engine oils for 60 to 90 cents a gallon. It is easy to see the potential loss to the government through mismanagement or improper disposal of these products. The most effective way of avoiding revenue loss is through effective management. One must determine how much slop fuel is being accumulated and whether there is a better procedure which can be implemented to reduce the amount of slop fuel being generated. For example, in preparing a tank for cleaning most discharge lines will draw off product down to a 16 inch or 18 inch level of the tank. The remaining fuel, although on-spec and of significant quantity, is often abandoned to the tank cleaning contractor. Often it is a simple task to attach a hose to the tank water drain line and recover most of the remaining fuel, blending it into usable stocks.

Recent Air Force investigations confirm that many people are unaware of the value of waste petroleum products and have not followed proper disposal procedures. At one particular location a civilian firm had been taking slop fuel from an undocumented holding tank and selling it to a commercial processing firm.

Paragraph 209.5.2, DoD 4140.25M outlines specific procedures for documenting and disposing of DLA-owned slop fuel stored at GOGOs. Procedures for reporting and disposing of slop fuel at GOCOs are found in paragraph 12-4, DFSCM 4140.3. DLA-owned slop fuel accumulated at COCO activities should be accounted for in accordance with instructions provided by the property administrator. Each terminal manager should insure that employees are aware of the value of slop fuel and follow proper management, reporting, and disposal procedures.

No Swansong for Nature's Wonder Glue

The following article, which has been abstracted with permission from the June 1980 Petroleum Gazette, an Australian publication, concerns bitumen, known in the U.S.A. as asphalt. However, Australian usage is that asphalt is the combination of bitumen mixed with sand and stones to pave their roads. Technically speaking, bitumen is any of various natural substances, such as asphalt, maltha, or gilsonite, consisting mainly of hydrocarbons and obtained through heat refining.

It's black, sticky and the ugly duckling of the oil industry.

But add a touch of science and imagination, and bitumen turns into a modern industrial swan of a hundred guises.

Chances are it's inside your refrigerator, assisting the insulation foam to stay in place. The apples and oranges from the greengrocer were borne on trees where a bitumen derivative coated pruning cuts.

Your house undoubtedly has bitumen in its insulation, in some of its paint, in damp-proofing on foundations and in the backing on any carpet-tiles on floors, as well as in some of the hidden electrical installations.

Natural gas starts on its way to factories and houses in pipelines protected by bituminous wrappings. Fresh water is reticulated from dams faced with bitumen.

A motorist driving in synthetic-soled shoes to a drive-in theatre will use bitumen as he activates the battery, presses on the accelerator, drives on to the asphalt road, applies the brakes, and parks at the theatre.

And all these uses are quite apart from bitumen's utilization in printing inks, explosives, railway ballasts, soil stabilization, tennis courts and running tracks and a host of other applications.

With such a wide demand for a major petroleum product, it might be thought that severe shortages of bitumen could be imminent.

There is no indication this will be the case. This is because of the inherent nature of bitumen, and the overall petroleum picture.

Latest estimates are that there are at least 15,400 million tons of potential bitumen in crude reserves available to non-Communist nations excluding U.S. and Canadian reserves (the Communist bloc does not release statistics). The free world's annual bitumen consumption is approximately 70 million tons, with the U.S.A. and Canada using almost as much as the rest of the free world put together.

Internationally, 80 percent of bitumen goes into civil engineering works, of which road-building is the major use.

The known uses of bitumen go back into pre-history. The Bible records that Noah used it to caulk the Ark. There is also Biblical evidence that the builders of the Tower of Babel used mortars based on bitumen to fasten the bricks together, and that it waterproofed the reeds of Moses' basket.

The Encyclopaedia Americana says archaeologists have established that the earliest use of which evidence still remains was in 3800 B.C. Nabopolassar, father of Nebuchadnezzar, is said to have paved the streets of Babylon with it. The encyclopaedia also says that reservoirs, canals, and bathing pools were also made watertight with bitumen at about this time. It is thought that the source was surface showings which seeped from the oilfields which abound in the region, and hardened through weathering.

The latest Encyclopaedia Britannica cites excavations which have established that the Indus civilization which flourished in Southern Asia in the period 3250-2750 B.C. paved major streets with burned bricks cemented together with bitumen in areas such as Sind and Baluchistan.

Down the ages, naturally available bitumen deposits have been put to use.

Possibly the best known of these natural pools is Pitch Lake on the island of Trinidad, in the Caribbean. There, the story goes, Christopher Columbus careened his ships for caulking for his return journey to his Spanish sponsors.

This lake, and one in Venezuela, provided most of the road bitumen used in the U.S. before the large-scale production of bitumen, after the turn of the 20th century, started through the controlled refining of crude petroleum.

The rapid development of bitumen as a specific product went hand-in-hand with the growth of the automotive industry and the use of kerosene for various purposes. As crude oil was refined to produce the fuels, its heavy residue was available for road surfacing as motorists clamored for smooth, all-weather roads.

Although natural asphalts are still used in minor applications, e.g. industrial flooring, most bitumen is now produced from crude oil processing.

As crude oil is heated, the different components separate into fractions. Distillation of crude oil makes use of the fact that boiling and condensation of the fractions take place at different temperatures.

The lightest fractions boil at the lowest temperatures and become petroleum gases. As the fractions become heavier, because of more complex molecular structures, petrol (gasoline), kerosene, diesel fuel and fuel oil are produced and, if the crude oil is of the right type, fractions from which lubricating oil, wax and bitumen can be derived.

Bitumen itself can be further processed so that a range of grades of bitumen is available. The relative hardness of the bitumen grades varies according to the nature of the original crude oil and which fractions have been removed.

At normal temperatures, bitumen generally is solid or semi-solid. Therefore it is necessary to liquefy it by heating to temperatures between 110 degrees centigrade and 230 degrees centigrade before it can be easily transported and used. Special ships, rail cars and road tankers with heating facilities and heated tanks are then needed to transport the hot bitumen.

Most grades are delivered as hot liquids ready for application.

However, some are delivered as "cutbacks", which are bitumen diluted with kerosene to thin it, or as "emulsions", which are stable suspensions of bitumen in water. These do not need heating before application, and after they have been placed on roadways, etc., the kerosene or water evaporates leaving the surface covered with bitumen.

For some industrial uses, bitumens are supplied in drums or even in solid form.

Bitumen is so widely used because it has a unique combination of waterproof, adhesive, durable and flexible properties, and these properties can be altered during processing to suit specific requirements.

One way is to blow air through liquid bitumen when it is hot. This produces a product which does not soften so easily on heating or become as brittle when cold. This is called "blown" bitumen.

Chevron Describes Its View of the Energy Future

by Denise M. Gower
Public Affairs Office

The outlook for world energy supply and demand during the remainder of the twentieth century was the topic of a presentation given by Chevron U.S.A. for DFSC employees at Cameron Station on 13 November 1980.

Giving the talk was Thomas G. Burns, Division Supervisor of the Supply-Economics Department of Chevron. Dave J. Bowen, General Manager of the Commerical and Industrial Division and Ken E. Johnson, Manager of Government Accounts, Marketing Department were also in attendance.

Mr. Burns described Chevron's forecast of U.S. energy and oil supply and demand with special emphasis on the roles that petroleum and synthetic fuels will play during the next 20 years. This included a discussion of the futures of tar sands, coal/oil gasification, alcohol fuels, shale oil, and coal liquids.

Mr. Burns also presented forecasts of consumption by end-use and the implications for U.S. energy policy.

Other topics included energy prices and their impact on inflation; petroleum inventory levels; the Strategic Petroleum Reserve; and the impact of current developments in the Middle East on short-term oil supplies.

Shown here are participants of the Fifth Annual Quality Assurance Representatives (QAR) Conference held in Stuttgart, Germany on 23-25 September 1980. Thirty-six conferees included representatives of all petroleum logistic agencies in Europe. The conference included reviews and updates on USEUCOM, NATO, USAFE, USAREUR, and USAVEUR missions.

Petroleum Management Standards Revised

by Ron Gones
Directorate of Technical Operations

In order to achieve accuracy and consistency in petroleum operations, running the gamut from inventory management to custody transfer, standardized measurement procedures have been prescribed by the oil industry.

These methodologies, reflected in the American Petroleum Institute Standard 2540 (API 2540); American Society for Testing and Materials D1250 (ASTM 1250); and Institute of Petroleum 200 (IP 200), permit petroleum volumes measured at any temperature to be corrected to "standard" volumes at either 60°F or 15°C. DFSC observes these commodity methods in its internal product management as well as in acquisition transactions.

Recent revision of the volume correction tables embodied by the above publications was made to better typify the physical attributes of contemporary petroleum products. This has resulted in an appreciable aggrandizement of the documents involved, as well as additional complexity associated with their application.

The transitional implementation of the new standards by both the public and private sectors will be made over a period of approximately 24 months. DFSC-T has instituted a project to assess the economic, logistic, and manpower resource implications of the use of the revised methods.

FY 1980: Small Business Contracts Exceed $1 1/2 Billion

The Office of Small and Disadvantaged Business Utilization (DFSC-AB) has released figures which show that during FY 1980 DFSC awarded a record dollar amount of contracts to small and disadvantaged businesses. This is an especially commendable achievement when one considers the instability of the petroleum market and the difficulty DFSC had obtaining coverage during the first half of the fiscal year.

The breakdown of contracts awarded during FY 80 to small businesses is as follows:

Small Business	$1,264.7 million
Set Aside	$ 22.4 million
Disadvantaged Small Business	$ 235.4 million
Labor Surplus Area	$ 7.5 million
Woman Owned	$ 6.4 million

Pipeline at Edwards AFB Begins Operation

by *Brian R. Jack*
Directorate of Supply Operations

Edwards AFB, California has officially joined 57 other military activities in CONUS reaping the benefits inherent in pipeline deliveries of aviation fuels. The valve opening ceremony inaugurating the new service on 2 October 1980 was attended by MGEN Conley, Base Commander, Edwards AFB; BGEN Seamon, Commander, DFSC; and BGEN Edminston, Commander, Western Area MTMC.

Pipelines are by far the most economical means of transporting fuels overland. It is estimated that the Edwards AFB pipeline will save DOD approximately $1.5 million over the next five years.

In addition to the monetary savings, pipelines are safer, more energy efficient, and more environmentally acceptable than other modes of bulk petroleum transportation.

In the past, Edwards AFB jet fuel requirements were resupplied by tank truck from various product sources located in California. The possibility of using the pipeline method for Edwards AFB was first evaluated by the Air Force in 1961 and again in 1965. Construction of a pipeline was found to be impractical at that time due to the low demand for fuel at

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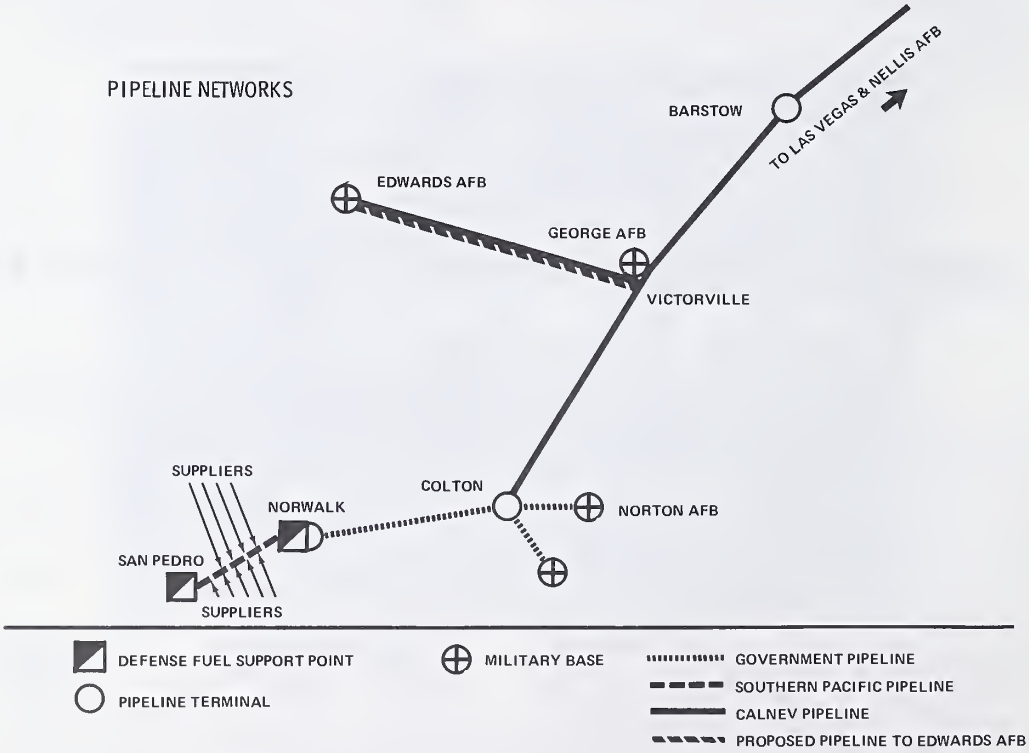


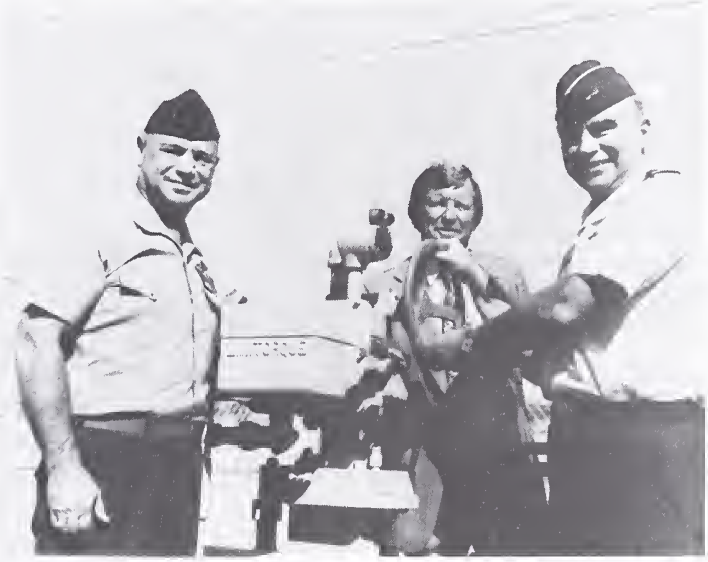
Edwards Pipeline: Consideration of Environmental Effects Precedes Construction

by F. H. Khattat
Environmental Control Office

In its April 14th issue, the Oil and Gas Journal presented reasons why pipeline construction by the U.S. pipeline industry has become increasingly difficult. Reasons given include the declining investment incentives and the cost of borrowing money for a less certain permitting process at all levels of government.

One such important requirement is the preparation by a contractor of an "environmental impact or assessment" report. This report should make it easy for a regulatory agency to identify likely adverse environmental impacts for a proposed pipeline project before granting a license, easement or permit to construct or operate the facility.

Detail requirements of the environmental report vary from state to state. In California, these requirements parallel those of the Council on Environmental Quality (CEQ) for federal projects. This article will, therefore, address the state of California's and federal requirements



Maj Gen Conley opens the valve starting fuel flowing into Edwards storage tanks. Observing are BGEN Seamon and Paul B. Strengell, manager of engineering for the contractor, Calnev Pipeline Company. During the inauguration ceremony, General Seamon expressed thanks "to General Conley and his staff who worked so hard to make this (pipeline) possible despite all the hurdles." One obstacle he described was the diversion necessary to avoid a group of rare alkali mariposa lilies, an endangered plant species found near Edwards in the path of the pipeline.

PIPELINE AT EDWARDS AFB BEGINS OPERATION (contd.)

Edwards. Also, some of the product sources could not be connected by pipeline. More recently however, all JP-4 has been supplied by Norwalk/San Pedro facilities which can ship via pipeline. Also, projected requirements for Edwards AFB showed substantial increase over the 1961 and 1965 consumption rates.

In view of the stabilized product source, fuel consumption increase, potential tank truck shortages on the west coast, and tank truck receiving limitations at Edwards AFB, action was taken by DFSC in August 1978 to establish pipeline service. Meetings between representatives of Calnev Pipeline Company, Edwards AFB, MTMC, DFSC, and the DFR-W were held to keep the project on track. Complicated environmental issues were successfully handled on site by Mr. F. Khattat who represented the DFSC Environmental Control Office in the lead agency role.

Calnev Pipeline Company erected a 30,000 barrel tank at George AFB and laid a 57 mile six inch pipeline from George AFB to Edwards AFB. The project entailed laying the pipe under a proposed flood control canal, around endangered mariposa lillies, Joshua trees, and through solid rock formations. The system was completed on 14 August 1980 and should provide economical, dependable delivery of jet fuel to Edwards AFB, California.

CONSIDERATION OF ENVIRONMENTAL EFFECTS PRECEDES CONSTRUCTION (contd.)

in relation to the petroleum pipeline service to Edwards AFB from George AFB constructed by Calnev Pipeline Company of Bloomington, California.

Before addressing the complete set of specific environmental requirements, a short background as to how the Defense Fuel Supply Center (DFSC) procures fuel pipelines is needed.

PROCUREMENT BACKGROUND

Procedures for negotiating a pipeline service are described in Appendix 2-10 I of DFSC Supply Operations Manual, known as DFSCM 4140.4. In brief, the Transportation Distribution Division (DFSC-OF) surveys the activity supply pattern, conducts a feasibility study of pipeline connection in relation to supply, storage, and quality control and discusses its finding with the military service involved.

If it is determined that a pipeline service appears economically competitive, negotiation is conducted jointly with HQ Military Traffic Management Command (MTMC) and a prospective offeror of a pipeline service, in accordance with a DFSC/MTMC Memorandum of Understanding. This negotiation results in either rejection, acceptance, or modification by the offeror of government conditions and stipulations including receipt, handling, storage, delivery and related services such as quality surveillance, testing, etc. In return, DFSC/MTMC accept a fair and reasonable transportation rate which is the basis for the contractor proceeding with the pipeline service. A rate agreement or an amendment to a current operating agreement is entered into by DFSC/MTMC with the offeror upon construction of the pipeline. Prior to construction, the contractor is accorded the right of entry to the receiving base for the purpose of surveying the location of the line and determining the appropriate manifold modification necessary for a future hookup. He also requests the granting of an adequate easement for the pipeline right-of-way.

At this point, it should be specified that in order to process the easement instruments the U.S. Army Corps of Engineers (COE) would, in accordance with 33 CFR, Part 230, request either an environmental impact statement or assessment. Usually, the military base receiving the pipeline service prepares the environmental document and submits it to the Corps. The Corps then issues an easement to the contractor which entitles him to lay the pipe inside base property.

Meanwhile, and before construction is begun, the contractor is required to prepare an environmental document as a condition of being granted a permit to construct and another to operate the pipeline. The requirement in California is for the contractor to submit an Environmental Impact or Assessment Report to a state, county, or local planning agency.

In accordance with the National Environmental Policy Act (NEPA), DFSC and the military installation were also required to issue an environmental document for two reasons:

● It was required as part of the DFSC Commander's decision to proceed or not to proceed with the proposal. The Commander must consider all reasonable supply options based on environmental, economic and technical factors.

● It was required under U.S. Air Force regulation 19-2 prior to granting easements by Edwards AFB and George AFB.

This is why a project such as the Calnev pipeline must involve Edwards AFB, George AFB, Calnev and DFSC in a set of complex state and federal environmental requirements.

(Figure 1 shows environmental compliance lead times in relation to other implementing milestones.)

ENVIRONMENTAL COMPLIANCE

Fortunately, the environmental requirements which prevailed prior to 29 November 1978 were simplified when the CEQ's regulations (40 CFR 1500) were published in the Federal Register in July 1979. DOD Directive 6050.1, "Environmental Effects in the United State of DOD Actions," effectively implemented these regulations on 30 July 1980. These regulations emphasized the streamlining of environmental documentation requirements with a view towards:

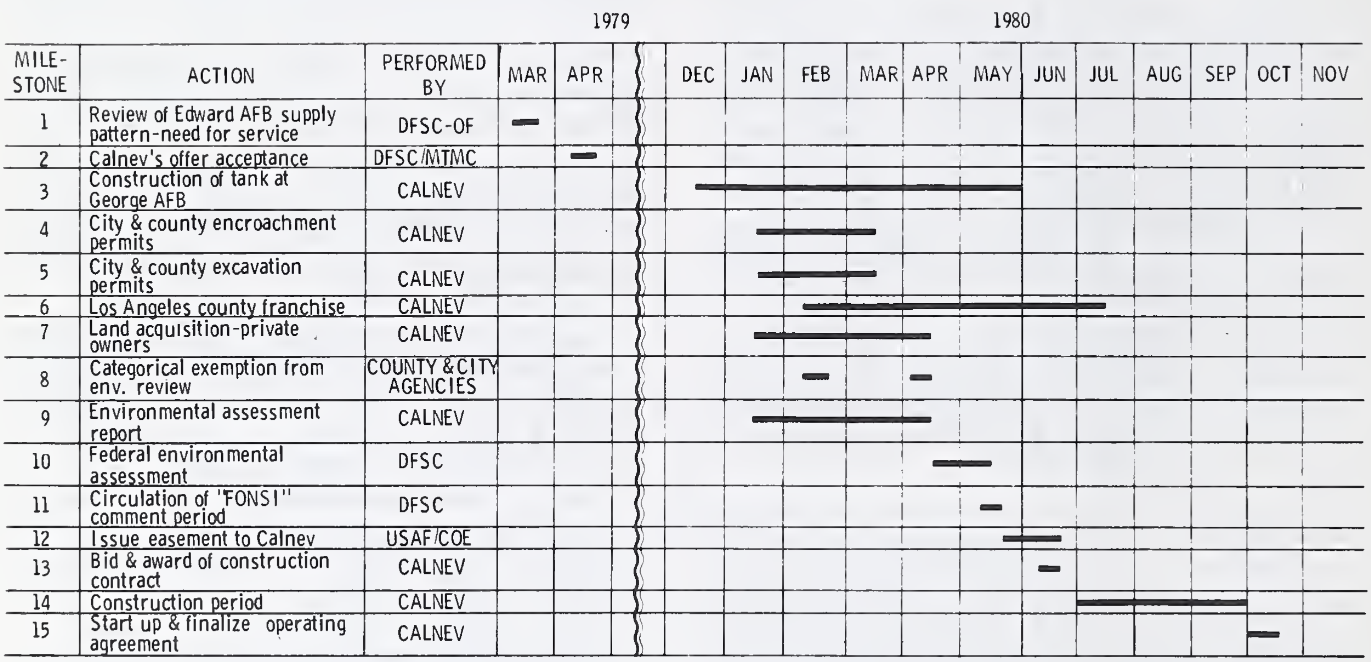
● Elimination of a duplication of effort by federal agencies through the issuance of a joint environmental assessment.

● Preparation of one environmental assessment instead of two or three.

● Preparation of a specialized document focused on real environmental issues rather than an encyclopedic one.

Accordingly, DFSC contacted all concerned to coordinate and pool efforts to produce one Environmental Assessment Report by

CALNEV PIPELINE IMPLEMENTATION MILESTONES



				1979						1980						
MILE-STONE	ACTION	PERFORMED BY	MAR	APR	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	Review of Edward AFB supply pattern-need for service	DFSC-OF	▬													
2	Calnev's offer acceptance	DFSC/MTMC		▬												
3	Construction of tank at George AFB	CALNEV			▬	▬	▬	▬	▬	▬						
4	City & county encroachment permits	CALNEV				▬	▬	▬								
5	City & county excavation permits	CALNEV				▬	▬	▬								
6	Los Angeles county franchise	CALNEV					▬	▬	▬	▬	▬	▬				
7	Land acquisition-private owners	CALNEV				▬	▬	▬	▬							
8	Categorical exemption from env. review	COUNTY & CITY AGENCIES					▬		▬							
9	Environmental assessment report	CALNEV				▬	▬	▬	▬							
10	Federal environmental assessment	DFSC							▬	▬						
11	Circulation of "FONSI" comment period	DFSC								▬						
12	Issue easement to Calnev	USAF/COE								▬	▬					
13	Bid & award of construction contract	CALNEV									▬					
14	Construction period	CALNEV										▬	▬	▬		
15	Start up & finalize operating agreement	CALNEV													▬	

Figure 1

Calnev which would satisfy environmental requirements of CEQ regulations, DOD Directive 6050.1, and U.S. Air Force regulation 19-2. To meet these objectives, DFSC, in accordance with section 1501.7 of CEQ regulations, held a scoping meeting.

When more than two federal agencies are involved, a scoping meeting is required. Such a meeting was held at HQ DFSC and another at Edwards AFB. The one at DFSC was attended by representatives of DFSC, MTMC, HQ Air Force System Command (AFSC), and HQ Tactical Air Command (TAC). The one at Edwards was attended by representatives of DFSC; Edwards AFB; George AFB; U.S. Air Force Civil Engineering Center, San Francisco; Defense Fuel Region, West; and Calnev Pipeline Company. During these meetings, the following agreements were reached:

- DFSC would serve as the lead agency in charge of monitoring progress and coordinating all actions. Edwards and George AFBs were designated as cooperating agencies.

- Calnev would prepare the

environmental assessment report to satisfy both the California Environmental Quality Act (CEQA) and NEPA.

- An outline for the environmental assessment was approved.

- The desired end product should be one federal environmental assessment which satisfies all concerned. Input would come from Calnev, DFSC, and Edwards and George AFBs.

- Strict time frames would be used to move the environmental action forward. A target of five weeks was established to accomplish all tasks assigned at the Edwards meeting.

Based on these agreements, Calnev provided DFSC and the two air bases with a draft environmental assessment report within three weeks from the scoping meeting. This report identified no significant local environmental effects that would prevent city and county jurisdictions from issuing appropriate encroachment and road excavation permits. (A list of permits obtained is shown in Figure 2.)

SPECIFIC ENVIRONMENTAL CONCERNS

County or city planning departments in California follow state environmental guidelines issued by the state Resources Agency. These guidelines require a thor-

LIST OF AGENCY PERMITS - CALNEV PIPELINE

GOVERNMENT LEVEL	RESPONSIBLE AGENCY AND SUB-AGENCY	AGENCY ACTION	ACTIVITY REQUIRING APPROVAL
FEDERAL	U.S. FISH & WILDLIFE SERVICE	LETTER OF DETERMINATION OF IMPACT AREA	NOTIFICATION ONLY
STATE	DEPT. OF TRANSPORTATION	UTILITIES ENCROACHMENT PERMIT	CONSTRUCTION UNDER OR ACROSS STATE HIGHWAYS
	REGIONAL WATER QUALITY CONTROL BOARD	COMMENT ON EMERGENCY SPILL PLAN	NOTIFICATION ONLY
COUNTY	LOS ANGELES COUNTY		
	ROAD DEPARTMENT	EXCAVATION PERMIT	EXCAVATION ALONG COUNTY ROADS
	DEPT. OF REGIONAL PLANNING	ENVIRONMENTAL REVIEW (EXEMPTION ISSUED)	ENVIRONMENTAL REPORTING
	SAN BERNARDINO COUNTY		
	ROAD DEPARTMENT	EXCAVATION PERMIT	EXCAVATION ALONG COUNTY ROADS
	FLOOD CONTROL DISTRICT	CHANNEL CROSSING PERMIT	CROSSING FLOOD CONTROL CHANNEL
	PLANNING DEPARTMENT	ENVIRONMENTAL REVIEW (EXEMPTION ISSUED)	ENVIRONMENTAL REPORTING
	KERN COUNTY		
	NONE REQUIRED	NONE REQUIRED	NONE REQUIRED
CITY	CITY OF ADELANTO		
	CITY PLANNER	REVIEW OF ALIGNMENT ON CITY ROADS	ALTERNATE PLANS
	CITY PLANNER	EXCAVATION PERMIT	EXCAVATION ON COUNTY ROADS
	CITY ADMINISTRATOR	ENVIRONMENTAL REVIEW	ENVIRONMENTAL REPORTING

Figure 2

ough environmental project review and evaluation to identify specific areas of environmental concern.

After such a review is completed, a public notice and, at times, a public hearing may be conducted in order to allow the public to become a part of the planning process of the project. If no critical environmental issues are identified, the contractor receives a "Notice of Negative Declaration" from the County Board of Supervisors. This notice permits the contractor to proceed with the project without further environmental review, and precludes the requirement of an environmental assessment report. Alternately, the department may request the filing of an Environmental Impact Statement with a lead time of approximately 10 to 14 months.

Calnev followed a different approach by not submitting the project for an environmental review. Rather, it requested an exemption from this requirement from Los Angeles County on the grounds that the pipeline fell within the definition of "non-project" and thus might be categorically exempted under Section 21084 of the Public Resources Code, known as the California Environmental Quality Act (CEQA). On 22 February 1980, Los Angeles County accepted this request.

Under this provision, projects such as the Edwards pipeline are termed "ministerial projects," defined to include activities that the state or local jurisdictions should support in the public interest. The success of this approach led to similar decisions by the San Bernardino County Environmental Improvement Agency and the City of Adelanto Planning Department. Kern County, where Edwards AFB is located, did not review the project since it was satisfied with the notices of categorical exemptions issued by the other three California jurisdictions.

The unprecedented exemption from environmental requirements in California nullified the need for Calnev to submit their environmental assessment report to local and county planning agencies for the state. An environmental assessment report was prepared, however, which included the notices of categorical exemptions. This document served as the basis for a DFSC decision of a federal "finding of no significant impact (FONSI)" as will be explained later.

If the Calnev pipeline project had not been judged to be exempt, it would have undergone local environmental scrutiny at a greater length and expense to the contractor.

FEDERAL COMPLIANCE

DFSC, as a federal lead agency on this project, was required to prepare an environmental assessment examining relevant local, regional, and national environmental issues in order to reach one of the following conclusions:

- Significant or critical local, regional and/or national environmental issues and effects requiring the preparation of an Environmental Impact Statement were identified.

- No significant local, regional, or national environmental issues and effects were identified. If so, a FONSI could be issued and made available to the affected public.

In this case, the DFSC environmental assessment identified no national or regional issues of concern. In accordance with Section E of DOD Directive 6050.1, the FONSI was issued and circulated to the areawide clearinghouses, the Southern California Association of Governments in Los Angeles, and the state clearinghouse in Sacramento.

The draft environmental assessment, as well as the Calnev draft Environmental Assessment Report, were reviewed by HQ AFSC and HQ TAC and the bases involved, who agreed that the issuance of a DFSC FONSI was the course of action to follow. While circulating the environmental assessment for comments, however, two problems were brought to our attention by HQ AFSC:

- Two sites on Edwards AFB contained archaeological finds that were in close proximity to the path of the pipeline.

- One site close to the planned pipeline at Edwards was a habitat for threatened biological species that might be impacted during construction activities.

The two sites which contained Indian relics were identified at Edwards through a survey conducted on 29 April 1980. These two sites are recognized in the Calnev Environmental Assessment Report (pages F-22 and F-25) as sites G-4 and G-5.

In order to protect these sites, an archaeologist was engaged by the contractor to survey the area. He recommended that the path of the line around the sites be designed to avoid them, or that prior to the start of pipeline construction, a professional curator collect the relics for identification, marking and deposition in a local museum.

With regard to the biological resources, a botanist contracted by Calnev surveyed the site. She found three threatened plants along the pipeline right-of-way on Edwards AFB and recommended they be transplanted elsewhere.

In summary, these events show that project planners should consult with the Environmental Office early in the planning process. This will enable the establishment of realistic target dates for construction and of start up schedules which allow adequate time for assessing projects from an environmental standpoint.

QAR CONFERENCE HELD

A Quality Assurance Conference held at DFR-P on 9 and 10 September 1980 was attended by DFR-P QARs and staff personnel, and representatives from the Joint Petroleum Office, POL elements of the military services, and DFSC. Briefings were given by personnel of the service components, and a presentation on energy sources was delivered by an industry representative.

DFSC Fuels Indoctrination Course Held in November

by *Denise M. Gower*
Public Affairs Office

The semi-annual DFSC Fuels Indoctrination Course held its fall session at HQ Defense Fuel Supply Center 17 November through 21 November 1980. The class was composed of twenty-five students from DFSC, two from U.S. Air Force Detachment 29, and one from the U.S. Army's General Materiel and Petroleum Activity.

The five day course, designed to acquaint new or previously unexposed DFSC employees with the workings of the petroleum and coal industries as well as with basic DOD petroleum logistics, featured two all day field trips and a host of military and civilian industry representatives who served as speakers. Speakers and their topics were: Cynthia Riggs, Public Affairs Department, American Petroleum Institute, on the petroleum industry; Hugh Hardy, Exploration Affairs Department, Exxon Company U.S.A., on exploration and production; Capt Michael Murphy, USA Quartermaster School, on refining; SP5 Bruce Shelton, USA Quartermaster School, on quality control/properties; CPT Joseph D. Palatka, USA Quartermaster School, on distribution systems; COL Richard L. Kail, DFSC-L, on defense petroleum logistics; Stewart H. French, USAF Detachment 29 on USAF petroleum logistics; COL Carson D. Orr, USA Energy Office, on USA petroleum logistics; Calvin J. Martin, DFSC-AE, on environmental influences on defense petroleum logistics; J. J. Daiak, DFSC-N, on market influences on defense petroleum logistics; and Edwin R. Anthony, National Coal Association, on the coal industry.

On 18 November the students visited the Getty Refinery in Delaware City, Delaware, and on 20 November, toured the Petroleum and Field Services Department of the USA Quartermaster School at Fort Lee, Virginia.

CAPT Hamilton, Deputy Commander, DFSC, presented class members with Certificates of Completion on 21 November 1980.

The DFSC Fuels Indoctrination Class of Fall, 1980

Quartermaster School Is Recipient of Smithsonian Exhibits

by *Will Green*
Public Affairs Office,
U.S. Army Quartermaster School
Fort Lee, Virginia

Mention "circulatory system" and most people would immediately think of the heart and blood vessels. To many of the military students entering courses of instruction in the Quartermaster School's Petroleum and Field Services Department at Fort Lee, it comes as a revelation, therefore, to learn that an oil well also has a "circulatory system."

This fact is pointed out in an exhibit used in training the students. Titled "Drilling Fluids," it is one of nine major exhibits, plus assorted displays and pictures, which are a gift to the Petroleum and Field Services Department from the Smithsonian Institution in Washington, D.C. These exhibits, originally presented to the Smithsonian by petroleum and chemical companies, help provide information on petroleum operations to students at Fort Lee.

The "Drilling Fluids" training aid shows how substances such as gum, starch, ground nutshells and others--unlikely substances to the uniformed--are mixed with mud and circulated in oil wells during drilling operations. This "drilling mud" is used in controlling pressures deep underground, and, in the words of Capt. Michael T. Murphy, senior instructor, "to insure that drilling can continue under changing conditions." It also aids in removing cuttings from the path of the drill and bringing them to the surface.

Murphy was instrumental in obtaining the exhibits from the Smithsonian. In March, while accompanying a class of Fort Lee students to the institution's display tracing the history and development of the petroleum industry, the captain learned that the display items were to be dismantled to make way for a new energy display. Since they were being made available to "academic institutions," and the Quartermaster School qualified as such, Murphy got some of them.

It was a long, arduous job getting all of the display material to Fort Lee. Much of it was heavy to handle. Fort Lee personnel used stake and platform trucks to transport it. The captain credits the people at the Training Aids Support Center at Fort Lee with a big assist with the project. "They are extremely helpful in the assembling and mounting of some of the more difficult exhibits," he said. By September, most of the items were in place and complete.

Although the exhibits are interesting even to the casual observer, they are far more than just "window dressing" for the Seaman Petroleum Laboratory and other sections of the department. Capt. Gregory Gibbons, chief of the Basic Petroleum Logistics Division, said of them, "They enhance the students' knowledge of petroleum operations, and help them learn about characteristics

This exhibit at the Petroleum and Field Services Department, obtained from the Smithsonian Institute, demonstrates the viscosity of various crude oils.

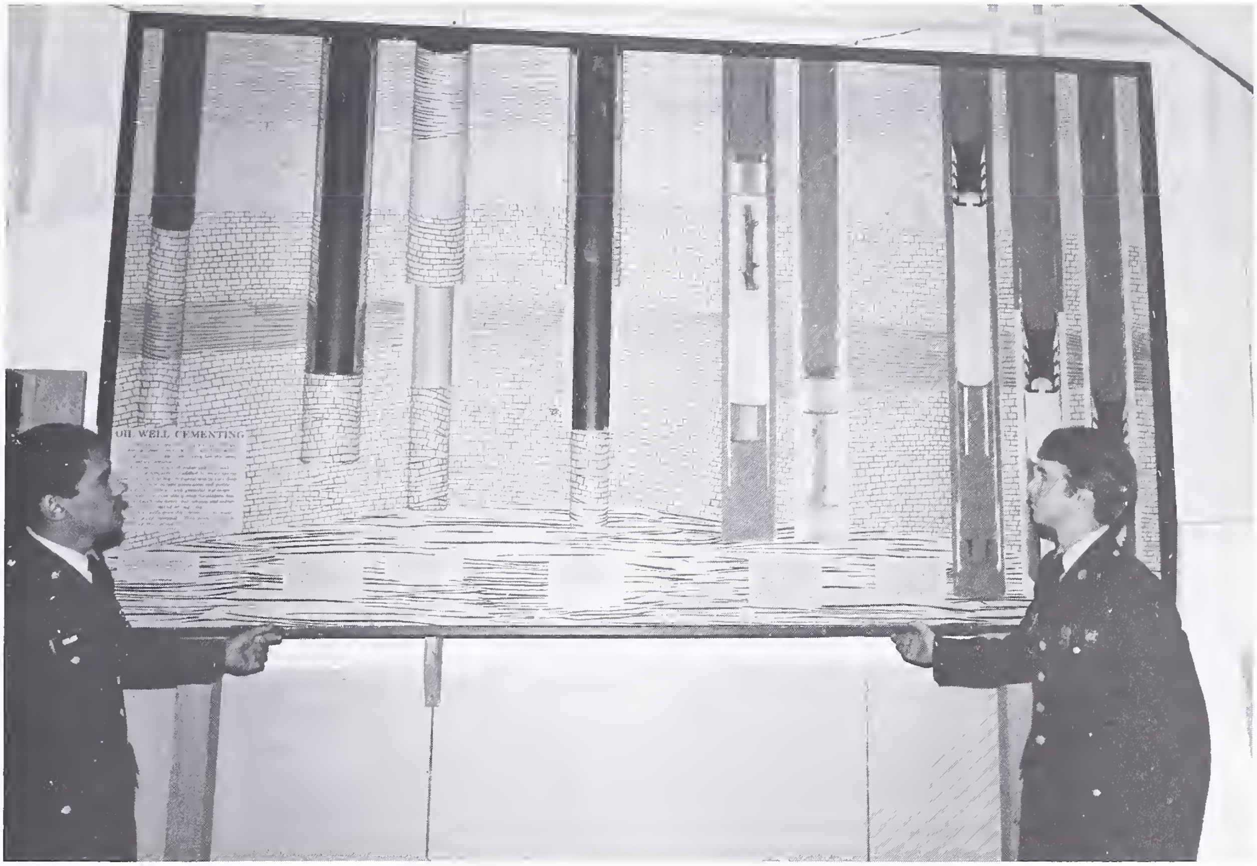
(U.S. Army photo by H. Washington)

of fuels they will be dealing with."

One exhibit shows the "acidizing" procedure. Hydrochloric acid is pumped into some oil wells to open pores and channels in oil-bearing rock. This provides an easy path from the rock formation to the well bore. Oil production is thus increased. An alternate procedure, "fracturing," is described in another exhibit.

Extending along an entire wall of one classroom, and part of another wall, is a color-coded chart revealing the geologic structure of oil-rich portions of Texas, Mississippi, and Louisiana--an area stretching some 1,200 miles. Different colors are used to indicate strata of sand and salt, shale, limestone, etc.--right down to the "basement rocks." The chart was compiled from information obtained by actual drilling. Colored dots show oil and natural gas producing fields. Murphy called it "one of the most valuable training aids possible to have."

Among other exhibits is one demonstrating the operation of a



PVT 1 Nicky Colon (l) and PVT 1 Donald Crowell, students in the Supply Handler Course, examine an exhibit at the Petroleum & Field Services Department, which shows oil well cementing.

well in an ocean floor; another showing the cementing procedure to separate oil and gas producing zones from each other and from water-bearing strata; and still another exhibit that demonstrates the viscosity (resistance to flow) of various crude oils. Some of these crudes are thick in their natural state, while others are much thinner and require less complicated processing.

Since the first well was drilled (in Pennsylvania in 1859), specifically to search for oil, "black gold" has become increasingly important to the world's economy. The Petroleum and Field Services Department at Fort Lee plays a significant role in training men and women to work with this crucial commodity.

As Murphy indicated, "Oil is constantly in the news. We at Fort Lee feel that in a very real sense we are where the action is."

A-V Presentation for Contractors Explains Defense Priorities and Materials Systems

Office of Assistant Secretary of Defense

The U.S. Departments of Defense and Commerce have prepared a joint audiovisual project explaining the system of priorities of certain defense contracts and orders.

The project describes the Defense Materials System and the Defense Priorities System and the benefits, rights and obligations of contractors for certain defense-related contracts and orders over unrated orders. Priority ratings are assigned to certain defense contracts and orders to insure that they receive the preferential treatment required by federal law.

The audiovisual package consists of 35mm slides with synchronized audio tape and will also be available on videotape. It was developed by DLA for DoD in conjunction with the Department of Commerce, which administers and enforces the Defense Materials System and the Defense Priorities System.

Distribution to DoD procurement and contract administration offices and to Department of Commerce District Offices throughout the country began in September 1980. These offices will arrange presentations for Defense contractors in their areas and provide the audiovisual package to contractors on a loan basis so that they may in turn show it to subcontractors and suppliers.

Firms interested in viewing the audiovisual presentation can arrange to do so by contacting a local procurement or contract administration activity of DoD or a Department of Commerce District Office.

Challenging the Energy Crisis with Training

CPT Mike Murphy, USA
POL Department, Quartermaster School
Fort Lee, Virginia

The Petroleum and Field Services Department of the Quartermaster School, Fort Lee, Virginia, has completed work on a new course of instruction for military officers and DoD civilians. The "Fuels and Energy Management" (FEM) course is seven weeks in duration and will give students an understanding of petroleum operations conducted by the four services (Army, Navy, Air Force, and Marine Corps), and provide a foundation for understanding the world energy situation and its impact on DoD.

Specifically, the course of instruction will train the student in the skills required to perform fuels and energy management duties. These include supervision and planning of supply point operations and quality surveillance/control operations; evaluation of pipeline designs; supervision and operation of pipeline and terminal complexes; and performance of petroleum and energy management staff functions including joint staff operations. Students will be drawn from the following:

- Officers and DoD civilians who have previously completed the six week Basic Petroleum Officer Course;
- Senior officers and DoD civilians who are programmed for petroleum or energy staff assignments and have had no recent petroleum training; and
- Officers from all services, allied officers, and DoD civilians who do not require the extensive hands on equipment training provided in the six week Basic Petroleum Officer course.

The ultimate goal of the Fuels and Energy Management Course is to establish a unified base of training for all the services. Therefore, future Senior Service and DoD level staffs will have a common foundation on which to base interservice staff functions.

Highlights of the course include instruction in the historical development of the petroleum industry, petroleum geology and drilling methods, refining and processing of hydrocarbons, alternative sources of energy, the Strategic Petroleum Reserve, a pipeline hydraulic design problem, and a three day pipeline operation problem. Current events instruction concerning the world energy situation concludes with each student preparing an oral presentation on an energy related topic. Also, the Defense Energy Information System, including applicable reporting requirements, is covered in detail. Terminal management and pipeline operation training is especially realistic because of the Quartermaster School's Petroleum Training Facility (PTF), a forty acre training area that includes eight miles of pipeline, 500,000 gallons of bulk tankage, related terminals and pump stations, tanker and aircraft mock-ups. The PTF provides hands-on training that is unavailable at any other DoD training center.

The U.S. Army's Seamon Petroleum Laboratory also provides FEM students with unique learning opportunities. In addition to training enlisted personnel in military occupational speciality (MOS) 92C, Petroleum Laboratory Specialist, and training all Quality Assurance Representatives for DoD, the lab supplements officer and NCO Laboratory training with a computer assisted lab analysis. The Simulated Petroleum Laboratory Exercise, better known as SIMPLEX, allows the student to instantantaneously interpret and evaluate laboratory analysis results provided by the computer.

Field trips are an integral part of the program of instruction and Fort Lee's convenient location provides the FEM course with some excellent opportunities to supplement classroom instruction. All classes take day trips to the Defense Fuel Supply Center at Cameron Station, Virginia; Craney Island Naval Fuel Depot (the largest Naval Fuel Depot in the continental U.S.) in Norfolk, Virginia; Langley Air Force Base, Langley, Virginia; and Yorktown Naval Fuel Depot, Yorktown, Virginia. In addition, Air Force and Navy students will spend additional orientation time with their respective service control points, the Air Force Energy Office and the Navy Petroleum Office. Long standing training agreements provide classes with opportunities for visiting a commercial pipeline pump station in Richmond, Virginia, a mobil oil company bulk distribution terminal, and a refinery.

For Army Officers, the FEM course is part of an even larger training program designed to provide the U.S. Army with qualified petroleum and energy managers (OPMS Speciality 81A). Currently the Army also offers a nine month assignment training with the Sun Oil Company, and a fully funded graduate school program.

Training with Sun exposes the officer to the day to day operation of a multi-national petroleum distribution system. The tour of duty includes actual assignment of responsibilities within the Sun management structure and prepares the individual for specific petroleum related assignments in the Middle East, the Caribbean, or the Quartermaster School.

The fully funded graduate school program provides the petroleum officer with the opportunity to obtain a master's degree in either Petroleum Engineering or Petroleum Management. The Army is currently supporting training at several civilian institutions including the University of Texas, Austin; Colorado School of Mines; and the University of Kansas.

The FEM course is scheduled for 10 May 1981 through 26 June 1981, and 9 August 1981 through 25 September 1981.

DOE PUBLISHES THIRD EDITION OF THE ENERGY INFORMATION REFERRAL DIRECTORY

The Department of Energy has announced publication of the third Energy Information Referral Directory. The Energy Information Administration publication identifies offices and people in DOE and other Federal agencies that deal with energy-related matters.

The directory (DOE/EIA-0205(80/3Q)) is published quarterly.

Single copies cost $4.50 and are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The annual subscription rate is $17 and the foreign annual rate is $21.25.

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